

## REMARKS

This paper is responsive to the Office Action dated October 05, 2009 wherein claims 1-4, 6-9, 11-18, 39-42 and 44-46 were rejected. By this response, claims 1, 2, 9, 39, and 42 have been amended and claim 44 has been canceled. No new subject matter is added in amendments. Support for the amendments can be found in the Application (e.g. in pages 9-10). Claims 1-4, 6-9, 11-18, 39-42 and 45-46 remain pending in this application. In view of the following remarks, Applicants request further examination and reconsideration of the present patent application.

### Response to Examiner's Response to Arguments

In page 2 of the office action, the Examiner stated that a new ground of rejection is made in view of newly found prior art. Examiner further mentioned that the new prior art is Friemel et al (US 2003/0055308). Applicants respectfully submit that this prior art is not a new prior art *per se*. It is the published application of the previously used prior art Friemel (US 6537220). The '220 patent was filed Aug. 30 2001 and assigned Application Serial No. 09/944,650. Likewise, the '308 published patent application identifies the same serial number and file date.

Moreover, Applicants previously submitted a Rule 131 Declaration to swear behind both Friemel (US 6537220) and Barnes. Therefore, it is inherent that swearing behind of Friemel (US 6537220) is equivalent to swearing behind of Friemel (US 2003/0055308). **Therefore, essentially there is no new ground of rejection and correction is requested.**

### 35 USC §102

In the Office Action, the Examiner rejected claims 1, 2, 8, 16, 42, and 45 under 35 U.S.C. § 102(e) as anticipated by Rafter et al. (U.S. Pat. No. 6,425,869; hereinafter "Rafter"). Of these, claims 1 and 45 are independent. Applicants respectfully traverse this rejection.

#### Independent claim 1 and 45

The amended independent claim 1 recites, among others, " a curved lens coupled to front faces of the MUT cells." Support for the amendments can be found in at least pages 9 and 10 of the application. For example, lines 20-2 in page 9 disclose:

"In accordance with various embodiments of the invention depicted in FIGS. 4-6, a focused

probe, comprising cMUT cells microfabricated on a CMOS wafer 18, is created by attaching a curved lens **to the front faces**, i.e., the **membranes**, of the cMUT cells. The purpose of focusing the ultrasonic probe is to limit the thickness of the plane that is interrogated by the ultrasound energy. However, since the membranes are delicate, care must be taken during lensing to not damage the cMUT cells."

The independent claim 45 recites, among others, " a curved lens coupled in at least close proximity or **directly to membranes** of the plurality of micromachined ultrasonic transducer cells."

Considering there is no new ground of rejection, applicants maintain arguments of Appeal brief filed on September 11, 2008 concerning the rejection of claims 1 and 45. In addition, Rafter does not teach about coupling a curved lens to **front faces** of the MUT cells as in claim 1. Rafter also does not teach about coupling a curved lens **directly to membranes** of the MUT cells as in claim 45.

In view of these deficiencies, among others, Rafter cannot anticipate independent claims 1 and 45 and their dependent claims. Applicants therefore respectfully request withdrawal of the rejections under 35 U.S.C. § 102.

### **35 USC §103**

In the Office Action, the Examiner rejected claims 1-4, 6-9, 11-18, 39-42 and 44-46 under 35 U.S.C. § 103 based on various references as listed below:

1. The Examiner rejected claims 1, 2, 8, 16, 42, and 45 under 35 U.S.C. § 103(a) as unpatentable over Rafter in view of Dreschel et al. (U.S. Pat. No. 6,605,043; hereinafter "Dreschel"), or Friemel et al (2003/0055308) or Friemel et al (US 6,537,220). **Of these, claims 1 and 45 are independent claims.**

2. The Examiner rejected claims 3, 4, 9, and 46 under 35 U.S.C. § 103(a) as unpatentable over Rafter in view of Dreschel further in view of Ishrak et al. (U.S. Pat. No. 5,667,491; hereinafter "Ishrak").

3. The Examiner rejected claims 6 and 7 under 35 U.S.C. § 103(a) as unpatentable over Rafter alone or further in view of Dreschel or Friemel references, and further in view of Fraser (U.S. Pat. No. 6,328,696; hereinafter "Fraser").

4. The Examiner rejected claims 11 and 12 under 35 U.S.C. § 103(a) as unpatentable over Rafter in view of Dreschel further in view of Hanafy (U.S. Pat. No. 6,258,034; hereinafter "Hanafy").

5. The Examiner rejected claims 13 and 14 under 35 U.S.C. § 103(a) as unpatentable over Rafter in view of Dreschel further in view of Ishrak further in view of Eaton et al. (U.S. Pat. No. 5,876,345; hereinafter "Eaton").

6. The Examiner rejected claim 15 under 35 U.S.C. § 103(a) as unpatentable over Rafter in view of Dreschel further in view of Ishrak further in view of Snow (U.S. Pat. No. 6,749,554; hereinafter "Snow").

7. The Examiner rejected claim 17 under 35 U.S.C. § 103(a) as unpatentable over Rafter in view of Dreschel further in view of Robinson (U.S. Pat. No. 6,659,954; hereinafter "Robinson").

8. The Examiner rejected claim 18 under 35 U.S.C. § 103(a) as unpatentable over Friemel references in view of Barnes et al. (U.S. Pat. No. 6,676,602; hereinafter "Barnes").

9. The Examiner rejected claims 39, 40, and 44 under 35 U.S.C. § 103(a) as unpatentable over the references as applied to claim 1, in either case further in view of Fraser and Chiao et al. (U.S. Pat. No. 5,882,309; hereinafter "Chiao") or Mason et al. (U.S. Pat. No. 5,931,785; hereinafter "Mason"). **Of these, claim 39 is an independent claim.**

10. The Examiner rejected claim 41 under 35 U.S.C. § 103(a) as unpatentable over Rafter alone or in view of Dreschel, in either case further in view of Fraser and Chiao or Mason, further in view of Robinson.

#### **(A) Independent claim 1 and 45**

The amended independent claim 1 recites, among others, " a curved lens coupled to **front faces** of the MUT cells." The independent claim 45 recites, among others, " a curved lens coupled in at least close proximity or **directly to membranes** of the plurality of micromachined ultrasonic transducer cells."

Considering there is no new ground of rejection, applicants maintain arguments of Appeal brief filed on September 11, 2008 concerning this rejection. In addition, Rafter does not

teach about coupling a curved lens to **front faces** of the MUT cells as in claim 1. Rafter also does not teach about coupling a curved lens **directly to membranes** of the MUT cells as in claim 45.

Dreschel and Friemel references do not obviate the deficiencies of the Rafter reference. Furthermore, Applicants previously submitted a Rule 131 Declaration to swear behind both Friemel (US 6537220) and Barnes. It is inherent that swearing behind of Friemel (US 6537220) is equivalent to swearing behind of Friemel (US 2003/0055308). Therefore, the present rejection must be withdrawn.

For at least these reasons, among others, Applicants stress that the cited references, taken alone or in hypothetical combination, cannot support a prima facie case of obviousness of independent claim 1, independent claim 45 and their dependent claims.

#### **(B) Independent claim 39**

The amended independent claim 39 recites, among others, "wherein the curved lens is coupled to the array of MUT cells in at least close proximity or **direct contact** with membranes of the MUT cells."

Considering there is no new ground of rejection, applicants maintain arguments of Appeal brief filed on September 11, 2008 concerning the rejection of claim 93. In addition, Rafter does not teach about coupling a curved lens **directly to membranes** of the MUT cells as in claim 39.

Dreschel, Friemel, Fraser, Chiao, or Mason do not obviate the deficiencies of the Rafter reference. For at least these reasons, among others, Applicants stress that the cited references, taken alone or in hypothetical combination, cannot support a prima facie case of obviousness of independent claim 39 and its dependent claims.

**(C)** Further, in page 2 of the office action, the Examiner stated that *"patentability for the claims is yet opposed since the prior art in terms of Rafter and Dreschel is yet evidencing that artisans entertained MUT array elements as interchangeable with single crystal-derived piezoelectric array elements and subject to the same conventional lens backing layering and associated electronics."*

However, Applicants respectfully submit that none of the cited references taken alone or in hypothetical combination teach, suggest, or disclose about any lens-coupling aspect or procedure (of claims 1, 39, and 45) and, specifically, coupling a lens to the membrane or front face of micro-machined ultrasonic transducers.

Accordingly, the Applicants respectfully request withdrawal of the rejection under 35 U.S.C. §103(a).

### Summary

For the reasons set out above, the Applicants respectfully submit that the application is in condition for allowance. Favorable reconsideration and allowance of the application are, therefore, respectfully requested.

If the Examiner believes that anything further is necessary to place the application in better condition for allowance, the Examiner is kindly asked to contact the Applicants' undersigned representative at the telephone number below. Telephone interviews are strongly encouraged by Applicant.

Respectfully submitted,

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